



PAARAGraphs

Since 1937

Newsletter for the Palo Alto Amateur Radio Association, Inc.



CALENDAR

January 1, 1997 PAARA Dues,

Mail to PAARA or give \$12 check, with Call, to:
Doug Schliebus -W6HXL, Treas.

February 7 PAARA Meeting, 7:30

Menlo Park Recreation Center
700 Alma Street, Menlo Park 7:30-9:30 PM

February 12, PAARA Board Meeting, 7:30

Red Cross Blvd. 400 Mitchell Ln., Palo Alto

March 7, PAARA Meeting, 7:30

March 12, PAARA Board Meeting, 7:30

'97 Dues \$12



Program

Feb 7, 1997, 7:30 P.M.

Speaker:??

Not confirmed at press time.

Check on NET Monday night before meeting.

PAARA Radio NET every Monday evening, at 8:30pm,
on the 145.230-600 repeater MHz, PL tone off. •



PRESIDENT'S PONDERINGS

de VIC BLACK, AB6SO

More E-Mail

A lot of you have e-mail, but no World Wide Web access. No problem. All you need is a plain vanilla e-mail account. The ARRL Technical Information Server, or Info Server, sends free information at your request. Messages must be in a computer readable format. Send e-mail with the subject **Info Request** addressed to info@arrl.org. The body of the message should read:

HELP
SEND INDEX
QUIT

In about 15 minutes you'll receive more than 25 pages listing available on-line information. It arrives as three messages---a help document and two indexes. They're split so you can read them in case your e-mail account doesn't support large files. I use this service to access contest rules and entry forms. Other things available are getting started as a ham, recruitment brochures, exam question pools, upgrades and VEC schedules, files about ARRL headquarters, field operations and affiliated ham clubs. QST and QEX indexes and summaries go back 8-9 years. Check information about the Shuttle Amateur Radio Experiment (SAREX), operating aids and awards, technical information, suppliers, and bibliographies. W1AW bulletins are available by e-mail or the Web site. Articles span a broad spectrum of interests including satellite orbital data, DX, propagation, FCC actions, and SAREX schedules. This could keep you busy for months! To be added to the W1AW e-mail list, send an e-mail to: w1aw-list-request@arrl.org. In the SUBJECT

(Continued on page 12) Ponderings

Miscellaneous Dates

Flea Market at Foothill

will resume next March

PAARA Palo Alto Amateur Radio Association

meets 1st Friday 7:30 each month, Net 145.230 each Monday 8:30, contact: Bill Rausch, AA6PA.....(408) 637-0622.

PAARA Auction, 2nd Saturday of October

contact Jerry Tucker, WA6LNV 415-961-3266

EMARC Electronics Museum Amateur Radio Club

Meets 4th Friday 7:30 each month,

contact Sheldon Edelman 415-858-2176.

NCDXC Northern California DX Club

Meets 2nd Friday each month, repeater for member info 147.360, each Thursday 8:00PM, contact John Troster W6ISQ 415-854-3939.

NorCalQRP Northern California QRP Club

Meets 1st Sunday each month, contact Jim Cates 3241 Eastwood Rd., Sacramento, CA 95821.

Perham Foundation, contact Jerry Tucker WA6LNV 415-961-3266

SPECS Southern Peninsula Emergency Communication System

Meets each Monday 8:00PM on Net 145.27, 224.36, 440.80 MHz contact Mike Hastings KB6LCJ, 408-243-6745 or 408-249-6909.

SCARES South County Amateur Radio Emergency Service

Meets 3rd Thursday 7:30 each month, San Carlos City Hall.

Net is on 144.45 & 444.50 (PL-100) 7:30 Monday evenings. contact Dick Collins K6ANN 415-593-8952

Disaster Services, Palo Alto Chapter, American Red Cross

Meets 3rd Wed. each month 7:30PM, HF, packet, BBS, ATV, OSCAR Gateway, NASA satellite,

contact Ruth Claypool 415-688-0423.

PACIFICON'97,

VE Exams, 3rd Saturday each month, 11AM

American Legion Hall, 651 El Camino Real, R.C.



The Board Minutes

Dave Bailey (WS6W), Secretary

January 8, 1997, 7:30PM Board Meeting

Present: Vic Black (AB6SO)*, Pres

Dave Bailey (WS6W), Sec.

Dave Mecham (W6EMD), VPres

Doug Schliebus (W6HXL), Treas

Steve Stuntz (K6FS)*

Kit Kohlmoos (K6ISO)

Wally Porter (K6EURO)

*Board Member

The meeting was called to order by Vic (AB6SO) and the January 3, 1997 PAARA meeting minutes were read by Dave (WS6W).

1997 Schedule - Vic reviewed the 1997 schedule he distributed at the last PAARA meeting. The auction is set for the second Saturday in October, but the Winter Party date is still undetermined.

Monday Night Net - Vic is working on the award suggested at the last PAARA meeting. Anyone who checks in at least 20 times per year receives an award and has his name published in PAARAGraphs.

1997 Budget - Doug (W6HXL) will start a budget for this year and receive the checkbook from Dave (WS6W) on Friday (1/10/97). The insurance rates will increase from last year.

New Business

1. We are planning to buy a new overhead projector. The cheapest one is about \$300. Fred (K6YT) will take a look at the one we have now and Steve (K6FS), will look into getting a new one.

2. Vic (AB6SO), has a partial agenda for the February meeting, but no speaker is set up yet. Steve (K6FS), hopes to get Bob Smithwick to speak the near future.

3. Biographies of members would be an interesting addition to PAARAGraphs.

4. The Board approved giving a \$25.00 Trader Joe's gift

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Palo Alto Amateur Radio Association, Inc.
PO Box 911
Menlo Park, CA 94026

President.....Vic Black, Jr., AB6SO.....(415) 366-0636
 Vice President.....Dave Meacham, W6EMD.....(415) 369 2633
 Secretary.....Dave Bailey, WS6W.....(408) 730-5215
 Corporate Secretary.....Kit Kohlmoos, W6ISO.....(415) 366 7813
 Treasurer.....Doug Schliebus, W6HXL.....(415) 851 0727
 Trustee/Property/Badges.....Fred Canham, K6YT(415) 948-9238
 ARES Officer.....Lily Anne Hillis, N6PGM ..(415) 325-5484
 Club Historian.....Steve Stuntz, K6FS.....(415) 322-4952

Board of Directors

John Buonocore, KD6ZL (415) 366 1658 '97
 Fred Canham, K6YT (415) 948 9238 '97
 Charles Grandjean, WD6FAF '98
 Steve Stuntz, K6FS (415) 322 4952 '97

(see "Calendar" for Board meeting times, visitors welcome)

PAARAGraphs Staff

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PAARA Meeting Minutes

January 3, 1997

submitted by:

Dave Bailey(WS6W), Secretary

President Vic Black (AB6SO), called the meeting to order and introductions were made. We had two first time attendees: Stan Cooper (K4DRD) and Bob Bayha (KF6HXS).

Announcements:

1. January 5 - Livermore swap meet and NorCal QRP meeting.
2. January 8 - PAARA Board Meeting - all are welcome.
3. January 9 - Winter party. See Kit (W6ISO) to sign up.
4. January 18 - VHF sweepstakes.
5. Dues are \$12.00. Pay Doug (W6HXL) or Dave (WS6W).

Old Business:

1. Monday Night Net - We want to liven it up a bit. Andy (VE3FZK), noted that the attendance dropped since it was moved to the 145.23 repeater from simplex. An award for those who checked in at least 20 times was suggested and Andy (VE3FZK) mentioned that a "wish you were here" prize, in which you do NOT win something if you don't check in, would be a good idea.
2. PAARAGraphs - Wally (K6URO), said that we need more local-level info in the news letter.
3. Badges - Anyone who wants a badge should see Fred (K6YT). He had some ready for people who ordered previously.

Continuing Business:

1. Vic (AB6SO), introduced the new officers and board members and thanked the retiring officers and board members.

(Continued on page 13)Meeting

TREASURER REPORT

Dave Bailey, WS6W

Revenues '96	OCT	NOV	DEC	1996 Total
Dues	6	12	0	600
Flea Market	0	0	0	6116.28
AMPEX Auction	3336.01	0	0	3336.01
Advertisements	0	0	0	600
Holiday Dinner	0	0	0	0
Raffle	0	0	0	81
Equipt. Sales				447.82
Total Revenues	3342.01	12	0	11181.11.
Expenditures '96				
Stamps/Envelopes	0	0	0	64
DMV	0	0	0	43
State of CA	0	0	0	10
City of Menlo Park	0	0	0	300
Speaker's Dinner	0	22	0	132
Flea Market	800	0	0	1737.24
AMPEX Auction	0	0	0	200
Meeting Refreshments	10.43	0	0	92.38
PAARAGraphs	198.68	199.78	173.51	2445.44
Picnic	0	0	0	86.63
Field Day	0	300	0	376.39
Holiday Dinner	0	0	0	0
Amateur Radio Class				155.16
Misc.	313.25	106.94	34.44	782.29
Total Expenditures	522.36	628.72	207.95	6424.53



PAARA PRIDE

wear your

PAARA Badge

to

meetings, picnics, field days, winter parties, ham fests, flea markets, Pacificons...
 (if you need one, contact Fred, K6YT)



(Continued from page 9) Ponderings

line write: **subscribe my-address**, where my-address is your own e-mail address.

Request to be added to e-mail lists of local ARRL officials. Pacific Division Director **Brad Wyatt, K6WR** publishes a newsletter at **k6wr@arrl.org**. Assistant Director **Jim Maxwell, W6CF**, is at **w6cf@arrl.org**. Santa Clara Valley Section Manager **Kit Blanke, WA6PWW**, is at **kit6pww@aol.com**. All of them have been speakers at PAARA within the past two years. The ARRL Web page is at **http://www.arrl.org/**. Subjects that may interest you include exam schedules, W1AW bulletins, a publications catalog and hamfest notices. This Web site home page is updated daily so check it often.

Space Travels

Satellite work seems to be complicated and confusing, but it doesn't have to be. Once while driving to work I heard a QRZ? from the space Shuttle on 2-meters FM simplex. I didn't snag him. Someone in Oregon got him and in a flash he was over the horizon. However, it's possible to work them with only a 5 watt FM H-T and a simple omni-directional vertical antenna, although higher power counts because of the FM capture effect. At about 220 miles altitude they're line of sight. Vertical antennas work best just as the shuttle crests the horizon or when the orbit doesn't cross directly overhead. High gain antennas such as vertical collinears have less radiation straight up. This is a disadvantage. Low gain verticals don't require tracking.

New FM frequencies are now used by **MIR Space Station**. Try 144.45 and 145.47 MHz (uplinks) and 145.81 MHz (downlink). The secondary downlink is 145.84 MHz. Try 144.45, 145.47, 145.49 and 145.55 MHz simplex. For packet try 144.49 MHz uplink and 145.81 MHz downlink. **Bob Warmke, W6CYX**, who talked to PAARA about his 2.4 GHz repeater, worked MIR on 20 meters CW. Out of this world DX! They used a helically wound antenna (like a Hamstick) pressed up against a window. I think they were QRP to keep RF down inside the space station.

Rebroadcasts of Shuttle communications, including ground control, are on 145.585 MHz simplex courtesy of Ames ARC. The shuttle doesn't transmit directly to ground control since most of the time they're not line of sight to Houston. Signals are relayed by satellites until they downlink so you'll notice a time lag. Send e-mail to **domo@news.ksc.nasa.gov** for daily Shuttle Status Reports. The message (not subject) should be **subscribe shuttle-status**. For Kennedy Space Center press releases, make the message **subscribe ksc-press-release**. Both messages can be in the same e-mail. Put them on two different lines. Remove your name from the list with the message **unsubscribe shuttle-status** or **unsubscribe ksc-press-release**.

Send e-mail to **jscnews-request@listserver.jsc.nasa.gov** for Johnson Space Center Mission Status Reports. The message should be: **subscribe**. NASA publications are available

on the Web at **http://www-pao.ksc.nasa.gov/kscpao/ksc-pao.htm**. Thanks to **Bob Korte, KD6KYT**, and Ames Amateur Radio Club President, **Larry Carr**, for Shuttle flight information. ☺☺



PROGRAM NOTES:

PAARA Program, January 3, 1997

— **Steve Stuntz, K6FS**

Proceedings were called to order by our new president, **Vic Black (AB6SO)**, who after introducing new officers and Board members, set the tone for 1997 with a reading of "A Ham's Night Before Christmas". This literary gem, perpetrated by **Gary Pearce (KN4AQ)**, of Raleigh, NC, was gleaned from the Internet by our irrepressible new Pres. (Incidentally, it will appear in this year's December PAARAGraphs; meanwhile, ye editor has copies for handout at next meeting.)

Unexpected privilege was a show-and-tell session by **Steve Sidelis (KN6CU)**, recently returned from Ensenada, Mexico, gave us a first hand by photo glimpse of the Flying Doctors at work on a medical mission. PAARA members will recall the enthusiastic account of that organization, given by **Milt Camp (K6OYX)**, at our October 1996 meeting. Steve had spent some time observing and photographing them in one of the remote villages they visit with medical and dental services. His shots revealed the primitive conditions under which Flying Doctors work, and reflected the local population's needs and appreciation for their dedicated attention. (Remember Milt's briefcase QRP station - five watts, 20-meter SSB + 6 AH 12-volt gelcell + random wire? He reported some neat DX worked from northern Guatemala during a rest period on a recent flight into the back country.)

Central theme of the evening was QRP operation and construction, starting with informal reports of 2-watt CW and sideband DX achievements.

Speaker/presenter of the evening was **Ori Mizrahi-Shalom (AC6AN)**, QRP rig-designer and builder par excellence and enthusiastic promoter of the Northern California QRP Club (NORCAL). "Doing more with less" keynoted his presentation of several QRP transceiver projects, including his latest achievement, the "38 Special", a 30-meter CW transceiver. Emphasizing the "home-brew" approach to QRP design and construction, Ori demonstrated several of **Wayne Burdick's** (Mr. NORCAL/QRP) designs, and kit projects, including "Pixie", consisting of a total of 23 parts, the outcome of a NORCAL contest: build it in one hour and get it on the air for

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New Business:

1. **Vic (AB6SO)**, has the 1997 schedule. If anyone has input, he/she should talk to one of the officers. Vic gave a copy of the schedule to each officer.
2. **Jim (KO6GM)**, presented the *365 Days of Duct Tape* calendar to **Andy (VE3FZK)**.
3. **Koert (KC6WCI)**, had free connections to the Internet for those interested.
4. **Andy (VE3FZK)**, has the T-hunt schedule for this year.

Operating News:

1. **Steve (K6FS)**, said that the Japanese speaker we had last year (**JA1BLB**), says 73 and will be in the area in May.
2. **Dave (W6EMD)**, worked the ARRL 10 meter contest in December on a 2-watt handie-talkie.
3. Photos from the Flying Doctors were passed around. The location featured is 15 miles south of Ensenada.
4. Someone inquired about Icom M7-101 experience.

Show and Tell:

1. **Bill (AA6PA)**, talked about "Your callsign will fly" award and the AMSAT meeting in early November of last year.
2. **Vic (AB6SO)**, read the Ham's Night Before Christmas from **KM4AQ** (Raleigh, NC).

After the break, the speaker, **Ori Mizarahi (AC6AN)**, spoke about QRP and homebrewing. He is involved with the Nor Cal QRP Club. He mainly spoke about receiver design and, in particular, the "38 Special" radio design. ☺☺☺

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certificate to the person at the Rec. Center.

5. It would be possible to resurrect the raffle. Have everybody buy his tickets and draw one ticket after the speaker is done. The winner would keep half the money and PAARA would keep the other half.
5. We hope to start another amateur radio class this spring.
6. **Kit (W6ISO)**, wants to have questionnaires and club application forms for new members. Also, **Vic (AB6SO)**, has a list of people who changed their calls.
7. **Vic (AB6SO)**, told us to brainstorm club activities and we will look at the budget and the schedule in greater depth at the next Board meeting. We hope to find more sources of advertising in PAARAGraphs. ☺☺☺



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Carl Smith, W0DWJ

January 9, 1997

Join us for pre-meeting eyeball

QSO



gab & gobble

6 pm— at Su Hong Restaurant
1039 El Camino Real, Menlo Park

—across from Kepler's Book Store—

PAARA MONDAY NIGHT NET

8:30 PM

145.230-600 MHz repeater

PL tone off

Latest news between monthly issues of
PAARAGraph

PAARAGraphs Ad Rates

PAARAGraphs accepts paid advertisements from non-members.
(short personal ads remain free for members in good standing).

All ad rates listed are per issue only.

1. Not for profit ads by association members for ham-related items and wants. No cost for business card size ads (additional space at \$2.50 per business card size).
2. For Profit organizations and/or individuals: \$5-business card size, \$25-half page, \$50 full page or back cover.

These fees may be reduced or waived in exchange for a valuable consideration that is given to the Association or its general membership. Such consideration must be in addition to any existing arrangements with the association.

The PAARAGraphs editors reserve the right to reject any ad deemed to be not in the best interest of the Association. All fees are for "scanner-ready" copy or text-only ads.



DX

The bands are starting to open up. Not in a spectacular manner, but starting to improve. 10 meters was open during the 10 meter contest week-end, but for me (here in California) I contacted only Wisconsin, Arizona and New Mexico, plus many California stations. But--it is better than it has been for several years. Some of our local members are now working Australia and New Zealand in the early evening on 10 meters. I think 1997 will see great improvements in all of our frequencies. Listen for the beacon stations for band openings and try a CQ around 6:30 PM local time on 10 meters and you may be surprised. A "dead" band may not be dead, as all stations may be just listening. Call CQ.

Ron, W6VG



VE

December 21, 1996 brought only 9 or 10 would be hams out for their exams in Redwood City. The passing percentage was very high, and obviously most of the exam takers had studied. On hand were our usual dependable VE examiners, headed by **Joe Horne KB6OWG**, with **Gene Irazarry KK6LO**, **Dan Curry WB6STW**, **Ron Panton W6VG**, & **Bill Sooman WB6UVO** (CW testing). It is very gratifying to tell an applicant that he/she has passed. However, as for the opposite situation, we each hate to tell the applicant that they must come back again to take the test. The whole scene reminds some of us of the old days at the Customs House in S.F. What a downer that was if you did not pass. We try to keep a happy face in the Redwood City exams. 73,

☺☺☺

Ron, W6VG

Amateur Radio Newsline

SLOW GROWTH IN HAM RADIO

The combined number of United States General, Advanced and Extra class license holders is declining, but no-code continues to grow. This according to 1996 year end figures published in the January 1st W5YI, Report.

The No-Code Technician continues to show the greatest increase in the number of people holding that class of license. There are now 6.7 percent more Technician and Technician Plus operators than there was a year ago. In fact, some all radio amateurs share these two classes of licenses. That's more than twice the number of only a decade ago.

And for the first time ever, the combined number of Extra, Advanced and General class operators declined in 1996. But that was offset by the growth in the numbers of No-Code techs making for slight one percent growth in the total number of hams coming into the service last year.

What does this all mean? W5YI says that there is a major shift in interests taking place in ham radio. Back in the 50's, 60's and 70's ham radio meant low band DXing, ragchewing and long range operations. That pool of High Frequency operators is now drying up says W5YI.

Others agree. They say that the traditional high frequency operator is being replaced by a massive influx of codefree licensees who have no inclination to ever upgrade. A new breed of radio amateur who seem very content to spend their entire ham radio careers on a single repeater, talking to the same people, day after day, in what was once experimental world above 50 MHZ. (Via W5YI, others)

Contests (a few)

Delaware QSO Party, Feb 1 to 3

North American Sprint, phone, sponsored by NCJ, Feb 2 (Feb 1, local time); New Hampshire QSO Party, 0000Z Feb 1 to 2400Z Feb 2.

Vermont QSO Party, 0000Z Feb 1 to 2400Z Feb 2

IDRA World Wide RTTY WPX Contest, by the Digital Journal, Feb 8 - 9

NW QRP Club Digital Contest, sponsored by the NW QRP Club, 1700Z Feb 8 to 0500Z Feb 9. 80 to 10 meters (except 30, 17 and 12 meters). 20 meters, only above 14.070 kHz.

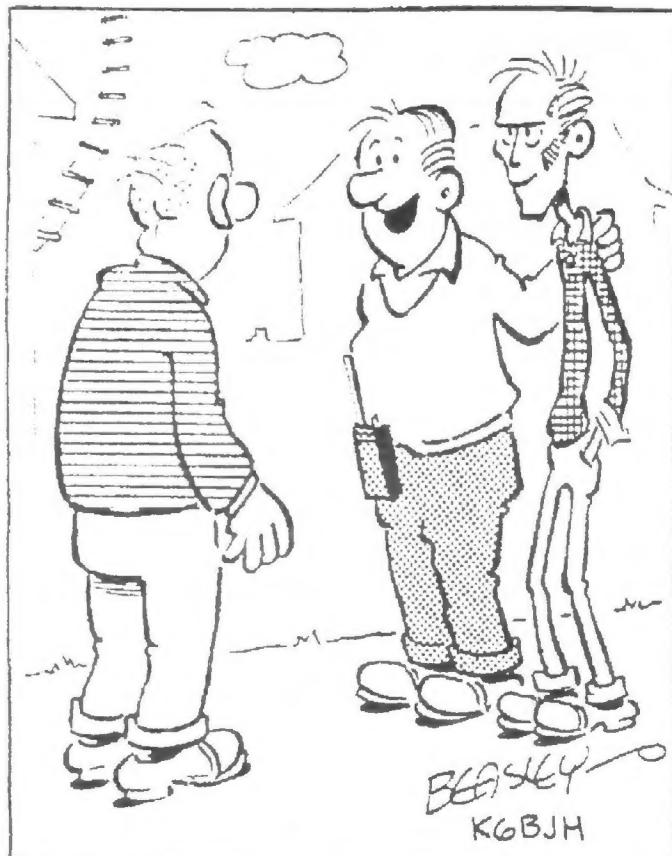
QCWA Golden Anniversary QSO Party, Feb 8-10 (CW) and Mar 8-10 (phone).

ARRL International DX Contest, CW. Feb 15-16

YL-OM Contest, CW. Feb 14-16

FYBO Winter QRP Field Day, Arizona ScQRPions, Feb 22-23.

☺☺☺



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ARRL Online

From ARRL Headquarters:

1-21-97

ANOTHER VANITY DELAY?

Callers to the FCC's Gettysburg, Pennsylvania, office are being told that it might be early March before the FCC resumes processing vanity call sign applications--including all of those received at Gettysburg since the end of November. An FCC spokeswoman this week cited unspecified "computer-related" problems for the potential delay, and said the FCC would release additional details probably next week. "We've been getting a lot of calls," she said. No vanity applications have been processed since December 19, 1996. While working to resolve the latest problems, Gettysburg personnel will continue to whittle down the stack of some 600 vanity applications that required special handling from the December 19 vanity call sign run. The FCC spokeswoman said that most of the applications in that "work in process" or WIPS stack involve situations where the FCC was unable to grant any of the applicant's call sign requests. However, additional call sign grants have trickled out of Gettysburg as the WIPS applications have been dealt with. The FCC also is in the midst of processing several hundred refunds for earlier unsuccessful vanity filers.

The FCC has not yet announced a date for the opening of Gate 3.

MORE ARRL CONTEST RULES CHANGES, CORRECTIONS

The ARRL Contest Advisory Committee and the ARRL Awards Committee have clarified the rules on using repeaters to make contacts for ARRL VHF and UHF contests. Prior rules have prohibited the use of "repeaters or repeater frequencies on 2 meters for the purpose of soliciting contacts." The change removes the words "on 2 meters" from the rules, thus prohibiting the use of all repeaters and repeater frequencies regardless of band. The ARRL Contest Branch has clarified a rule change announced recently that will affect the ARRL International DX Contest starting in 1998. The change eliminates the 10-minute rule for multioperator single transmitter entries only, not the two-transmitter category as announced earlier. The current rules require a station to remain on a band for at least 10 minutes once operation has begun on that band. The new rule--which will not take effect until the 1998 contest-- instead allows for six band changes per hour, which lets a station quit an unproductive band after a single contact. Additionally, the allowed six

band changes are for a clock hour, and not just an arbitrary 60-minute period.

Licenses-renewal reminders:

The ARRL has begun mailing license-renewal notices to members whose ham tickets are about to expire. The renewal package will include an FCC Form 610 and an FCC addressed envelope. Nearly 3100 notices were set to be mailed this past week to hams whose licenses will expire between February 17 and May 30, 1997. The last renewal notices sent by the FCC covered licenses expiring on February 16, 1997. Now that FCC has stopped sending renewal notices, the ARRL decided to resume this popular member service.

Nonagenarian Novice: Derward Day, KC8FPJ, of Northville, Michigan, recently obtained his Novice ticket at the age of 91, demonstrating it's never too late to take up a new hobby. *ARRL* ☺☺

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a confirmed contact (!).

In response to questions, Ori showed the "49-er", so called because it works 40-meter CW, powered by a commonplace 9-volt dry cell. As designed and built by Ori and several other NORCAL members, the whole rig, battery and all fitted neatly into a pocketable snap-cover metal can originally containing "Altoids", a brand of mints. This turned into one of NORCAL's most popular projects due to its minuscule dimensions and potential capability to "work the world". Ori's own version, built to even smaller size, worked Dallas, TX, on 600 milliwatts, first time out.

Another version of similar design was a complete transceiver (after the 49-er paradigm) built into the shell of a 9-volt battery (!).

Ori then went into extended detail on receiver design, describing techniques for deriving receive and transmit frequencies for single-fixed-frequency QRP rigs, emphasizing the use of easily available, low-cost parts including crystals and circuit-boards. One significant challenge was redesigning a direct-conversion receiver into superheterodyne "38-special", for 30 meters, powered by an 8-volt source, and utilizing integrated circuits throughout - no transistors. Note: the resulting radio is a transceiver, rather than a receive-only unit.

Despite problems with PAARA's ancient overhead projector (more later from your Board of Directors), Ori proceeded with a lengthy, informative discussion of design and construction, keeping in mind the QRP objectives of home-brew, kit assembly, and low power. ☺☺

PAARA-Palo Alto Amateur Radio Association P.O. Box 911, Menlo Park, California 94026-0911

Club meetings are on the first Friday of each month, 7:30pm at the Menlo Park Recreation Center, 700 Alma Street, Menlo Park, CA. • Radio NET every Monday evening, at 8:30pm, on the 145.230-600 MHz repeater, PL tone off. • Membership in PAARA is \$12.00 per calendar year which includes a subscription to PAARAGraphs. • Make payment to the Palo Alto Amateur Radio Association.

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COAST TO COAST

A small, high-contrast map of the state of Michigan. The map is mostly black with white outlines of the state's borders and some internal features. A single white star is placed in the upper right quadrant of the map.

February

**Palo Alto Amateur Radio Association, Inc.
PAARAGraphs Newsletter
P.O. Box 911
Menlo Park, California 94026**

FIRST CLASS MAIL



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